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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,761	08/01/2004	Kun-Chih Wang	NAUP0582USA	4760

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EXAMINER
KARIMY, MOHAMMAD TIMOR

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 10/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/710,761	WANG, KUN-CHIH	
	Examiner	Art Unit	
	Mohammad Timor Karimy	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 16 objected to because of the following informalities: In claim 16 line 3, the limitation "surface" seems redundant. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-8 and 10-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang (US Patent 5,831,330).

With respect to claim 1, Chang discloses in figures 3-7, a scribe line structure, comprising:

a substrate 20;

a plurality of dielectric layers (22, 26 and 30) formed on the surface of the substrate 20 comprising a structure which would read on the claimed process monitor pattern since the metallic structure 24 & 23, M1, 25 and 27 could function as a structure to monitor metal deposition process.

Chang further teaches a dummy metal structure (M3, figure 3) formed on the surface of the substrate 20 connecting with the process monitor pattern and exposed in

the scribe line region (note that prior to the deposition of the protection layer 34, the dummy metal region is exposed).

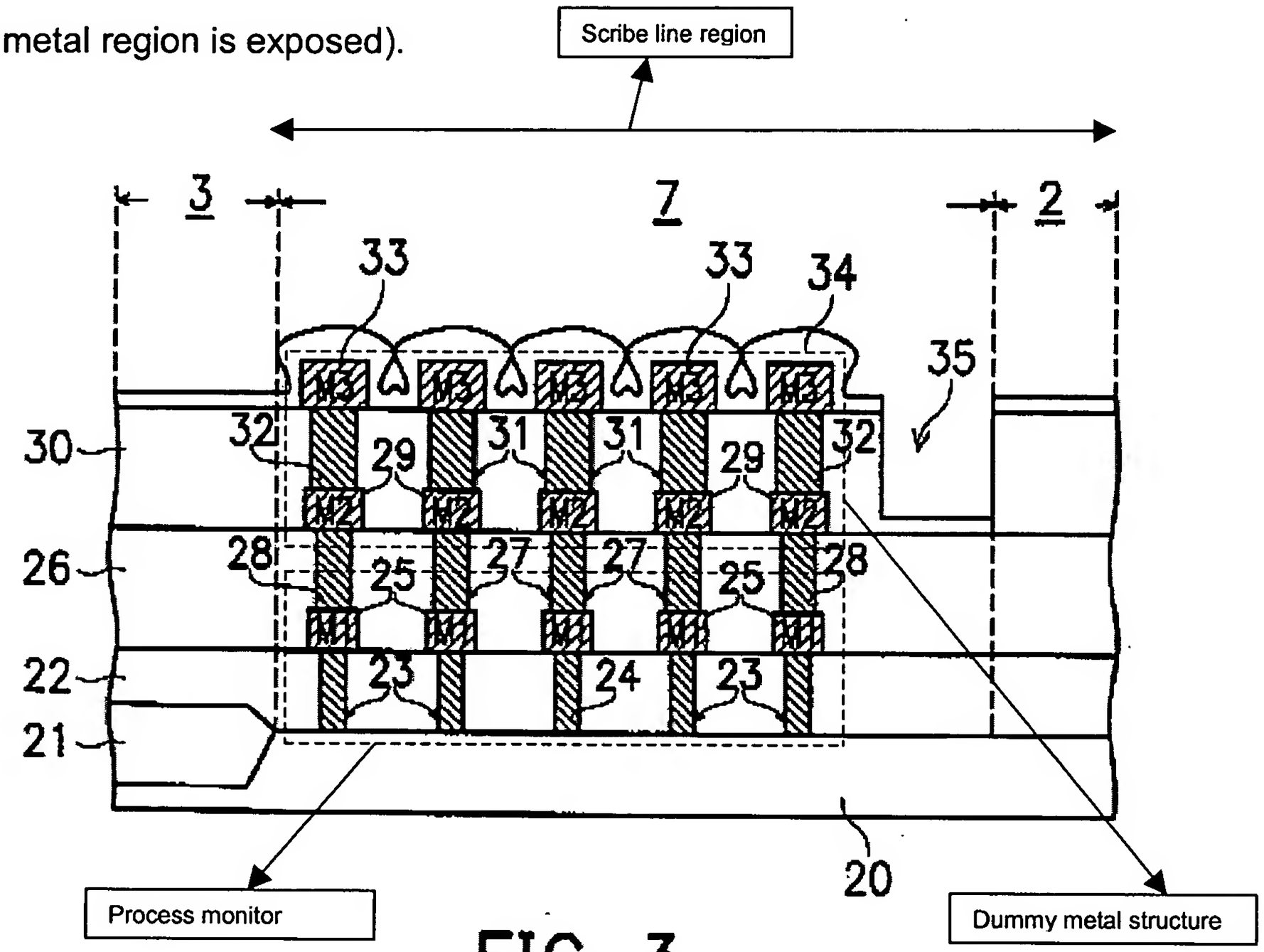

FIG. 3

With respect to claim 3, Chang discloses the scribe line structure of claim 1 wherein the dummy metal structure (see fig. 3 above) comprises a plurality of dummy vias (note the vias in the dummy metal region in fig. 3 above).

With respect to claim 4, Chang discloses the scribe line structure of claim 1 wherein the dummy metal structure comprises a plurality of metal layers (see fig. 3 above).

With respect to claim 5, Chang discloses the scribe line structure of claim 1 wherein the process monitor pattern is made of metal.

With respect to claim 6, Chang discloses the scribe line structure of claim 1 wherein the process monitor pattern comprises metal structure, which can function as feature dimension measuring elements.

With respect to claim 7, Chang discloses the scribe line structure of claim 1 wherein the surface of the substrate further comprises a protective layer 34 covering two sides of the surface of dielectric within the scribe line region (see figure 3).

With respect to claim 8, Chang discloses a scribe line structure comprising:

a substrate 20, the surface of the substrate comprising at least a scribe line region (see figure 3);

a plurality of dielectric layers (22, 26 and 30) formed on the surface of the substrate 20 comprising a structure which would read on the claimed process monitor pattern since the metallic structure 24 & 23, M1, 25 and 27 could function as a structure to monitor metal deposition process.

Chang further teaches a heat irradiative structure (dummy metal structure – see fig. 3 above) formed in the plurality of dielectric layers (22, 26 and 30) connecting the plurality of dielectric layers with the surface of the substrate and exposed in the scribe line region (note that prior to the deposition of the protection layer 34, the dummy metal region was exposed).

With respect to claim 10, Chang discloses the scribe line structure of claim 8 wherein the heat irradiative structure is a dummy metal structure.

With respect to claim 11, Chang discloses the scribe line structure of claim 10 wherein the dummy metal structure comprises a plurality of dummy vias.

With respect to claim 12, Chang discloses the scribe line structure of claim 10 wherein the dummy metal structure comprises a plurality of dummy metal layers.

With respect to claim 13, Chang discloses the scribe line structure of claim 8 wherein the heat irradiative structure (dummy metal region, see figure 3) connects with the process monitor pattern (see figure 3 above).

With respect to claim 14, Chang discloses the scribe line structure of claim 8 wherein the process monitor pattern is made of metal.

With respect to claim 15, Chang discloses the scribe line structure of claim 8 wherein the process monitor pattern comprises metal structure, which can function as feature dimension measuring elements.

With respect to claim 16, Chang discloses the scribe line structure of claim 8 wherein the surface of the substrate further comprises a protective layer 34 covering two sides of the surface of dielectric within the scribe line region.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang in view of Chooi et al. (US Patent 6,284,657 B1).

With regard to claim 2 and 9, Chang discloses the scribe line structure of claims 1 and 8 as recited in the rejections of claims 1 and 8 above. Chang further discloses a plurality of dielectric layers comprising metal layers; however, Chang does not explicitly teach the dielectric layers having a dielectric constant less than or equal to 3.

Nonetheless, Chooi teaches in column 8 lines 78-52 a dielectric constant of K=1.9 to 2.1 (dielectric constant for Teflon) for the dielectric and barrier layers. Chang and Chooi are combinable because they are from the same field of endeavor (namely using low-K dielectric materials within the metal interconnects). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use Teflon having a dielectric constant of 1.5 to 2.1 as taught by Chooi in Chang's dielectric layers. The motivation for doing so would be to use low-K dielectric to reduce the parasitic capacitance in the semiconductor device (see column 2 lines 56-60). Therefore, it would have been obvious to combine Chang and Chooi for the benefit of reducing parasitic capacitance.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sato et al. (US Pub. 2003/0034567 A1) discuss the use of scribe line device, dummy wiring region and inter-level dielectric layers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Timor Karimy whose telephone number is 571-272-2006. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mtk

KENNETH PARKER
SUPERVISORY PATENT EXAMINER